

WHAT IS CLAIMED IS:

1. A method for manufacturing a semiconductor device, the method comprising:
  - depositing an insulating layer on a semiconductor substrate;
  - forming an opening of the insulating layer exposing a field region of the semiconductor substrate;
  - forming a trench in the semiconductor substrate on the exposed region in the opening;
  - performing independently an adsorption reaction of TEOS and a decomposition/recomposition reaction of TEOS using O<sub>3</sub>, thus depositing an oxide layer in a thin thickness on the surface of the semiconductor substrate; and
  - depositing repeatedly the oxide layer to bury a plurality of the oxide layer in the trench.
2. A method as defined by claim 1, wherein depositing the oxide layer comprises:
  - introducing TEOS in a reactor having a high temperature of 500 to 600°C and a low pressure of below 100 torr to adsorb TEOS on the semiconductor substrate;
  - interrupting the introduction of TEOS and discharging remaining TEOS from the reactor; and
  - providing the pressure of the reactor with a base pressure of above 100 torr and introducing O<sub>3</sub> in the reactor to decompose and recombine the adsorbed TEOS, thus depositing the oxide layer on the semiconductor substrate.

3. A method as defined by claim 2, wherein before the adsorption of TEOS, the semiconductor substrate is cleaned and annealed in the reactor.

4. A method as defined by claim 3, wherein the semiconductor substrate is cleaned in an HCl solution.

5. A method as defined by claim 4, wherein the semiconductor substrate is annealed in the reactor in an atmosphere of O<sub>3</sub>.

6. A method as defined by claim 5, wherein the semiconductor substrate is annealed in a temperature of 500 to 600°C.

7. A method as defined by claim 1, wherein the oxide layer is deposited in a thickness of a few Å.